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ABSTRACT

As part of a Student Outcomes Model, a study was conducted of attrition in the 1975 freshman class at the University of Colorado using longitudinal survey data from nonreturning students and those currently enrolled. Discriminant analysis was employed to identify factors that distinguished persisters, academic dismissals, stopouts, and transfers. It was found that academic ability and frequency of using academic and vocational advising sources were the most important distinguishing variables, while others, such as importance of intellectual goals, hours worked, and number of hours per week spent studying, were also significant. Some differences were found by sex and when comparing persisters with all types of nonpersisters combined into one group. The importance of academic and support services on campus and the utility of discriminant analysis in identifying potential dropouts are noted. (SW)

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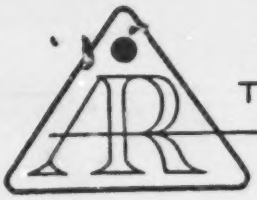

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A LONGITUDINAL STUDY OF ATTRITION:

A CASE STUDY AT A STATE UNIVERSITY

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ABSTRACT

As part of a Student Outcomes Model, this study examined attrition in the 1975 Freshman Class at the University of Colorado with longitudinal survey data from nonreturning students and those currently enrolled. Discriminant analysis was used to identify factors that distinguished among persisters, academic dismissals, stopouts, and transfers. The study found that academic ability and frequency of using academic and vocational advising sources were the most important distinguishing variables while others such as importance of intellectual goals, hours worked, and number of hours per week spent studying, were also significant. Some differences were found by sex and when comparing persisters with all types of nonpersisters combined into one group. This study points out the importance of academic and support services on campus and also shows the utility of discriminant analysis in identifying potential dropouts.

INTRODUCTION

Student attrition has long been regarded as an important topic of research among college and university administrators. The students who fail to complete their academic degrees represent not only a drain on institutional resources, but also unrealized returns on student investments and wasted student talent. In addition, the long term effects of such an experience may be negative enough to follow a student for years to come. Many studies have been conducted which examine why students leave college, which students leave, and how attrition can be prevented -- especially for those students who are not necessarily forced to leave the institution as a result of poor grades. Comprehensive reviews of past attrition studies can be found in Knoell (1966), Tinto (1975), Cope (1975), Astin (1977) and Pantages (1978).

Recent studies suggest that more precise definitions are important if we are to understand the attrition phenomenon. For instance, Tinto (1975) and Cope (1975) argue that dropouts need to be categorized by the "type" of withdrawal since patterns of interaction within an institution and the motivation for obtaining an education are different for involuntary and voluntary leavers. Rossman and Kirk (1970) and Astin (1972) point out that it is important to distinguish academic withdrawals from voluntary withdrawals since academic ability and grade performance are the most important factors in predicting persistence.

One problem with conducting multivariate analyses of data involving persisters and several types of dropouts is that the usual regression techniques are inappropriate for examining differences between several categorical dependent variables. Tabular analysis or analysis of variance techniques are appropriate but not efficient in examining the relative contribution of many factors to persistence or type of attrition. However,

discriminant analysis provides a means of determining the extent to which a set of variables or variable clusters maximally distinguish between groups of students and the relative contributions of these variables to this discrimination. Only a few attrition studies have used this analytic technique, and some of these are summarized below.

Maudal et al (1974) used demographic, academic, and personality variables to distinguish between dropouts, transfers, and persisters. They found that academic variables were associated with dropouts and personality variables with transfers. Transfer students appeared to be more similar to persisters than to dropouts. Baumgart and Johnstone (1977) found that entry level test scores were related to persistence and three types of withdrawals. When they subdivided their students by part-time/full-time status and by sex, they found that different variables were important for each subgroup in predicting attrition. Hanson and Taylor (1970) showed that ability differentiates academically successful from unsuccessful students and that personality factors distinguish between voluntary withdrawals and persisters. Smith (1976) also found that personality variables can be used to separate persisters from dropouts. Rose and Elton (1966) reported that dropouts were hostile, maladjusted, and had a poor scholastic orientation. Persisters were described as conforming in their behavior. Morgan (1974) confirmed that latter finding, but also discovered that both the nonauthoritarian thinker, and those most inteilectually liberal, were likely to withdraw.

All of the studies cited above found that academic ability was the

most important factor in distinguishing among persisters and different types of dropouts. With the exception of Baumgart and Johnstone (1977), all of the studies also examined personality variables and generally found that they were associated with persistence or withdrawal. However, these studies rarely examined the relationship between attrition and such non-personality factors as family background, expectations of the college experience at entry, academic and vocational goals, and campus experiences. This study examined these variables for persisters and for three types of withdrawing students in a discriminant analysis. One unique feature of this research is that it is one phase of a model developed to examine the impact of institutional programs on student outcomes. Before discussing the present study in more detail, a brief description of this planning model will be given.

STUDENT OUTCOMES MODEL

The Student Outcomes Model at the University of Colorado was developed to provide a structure for the systematic collection of student data through the use of surveys. The information gained through these surveys is used to measure the impact of the University experience on students and assist in needs assessment, program development, resource allocation, and evaluation.

The Model includes variables related to students' background, attitudes, values, goals, abilities, and the extent of change in these variables. The Model consists of four basic questionnaires: 1) Freshman Questionnaire, 2) Exiting Student Survey, 3) Graduating Student Questionnaire, and 4) Alumni Survey. The Model allows for longitudinal (cohort) and cross-sectional analysis.

Longitudinal studies involve testing the same students over time in their college experience. Questionnaires are given to students as freshmen,

when interruptions occur in enrollment, at graduation, and as alumni. the testing of cohort groups controls for many external variables.

Cross-sectional studies include responses from a sample of students representative of those at different class levels and are measured at the same point in time. Change is inferred by comparison between classes assuming that students have similar demographic characteristics. Cross-sectional studies are conducted with exiting students, graduating students, and alumni. More details on the Student Outcomes Model can be found in Endo and Lenning (1978).

STUDY DESIGN AND SAMPLE CHARACTERISTICS

Seventy-five percent of the entering fall 1975 freshmen (n=3,700) at the University of Colorado at Boulder completed a Freshman Questionnaire which provided information on their family background, career plans, expectations, high school classroom experiences, self-evaluations of ability, and goals for attending college. In addition, demographic and academic data from institutional records on each student were combined with their survey responses. Three years later in the fall 1978 term, a followup survey was sent to a random sample of 461 first and second year nonreturning students. The followup was sent after three years so that most of the nonreturning students could be classified definitely according to their subsequent plans. Also, students were less likely to answer surveys immediately after their departure because the decision to leave an institution was often coupled with anxiety and apprehension. In the spring 1979 term, the followup survey was also sent to a random sample of 580 persisters who were continuously enrolled through the fall 1978 and the beginning of the spring 1979 terms.

The followup survey measured important campus factors that were thought to distinguish persisters from academic dismissals, stopouts, and transfers. These items included frequency of using various academic and vocational

advising sources on campus, number of hours studied, number of hours worked, type of job held during the academic year, and concern for financing education. Each student's responses to their followup survey were combined with their previous Freshman Survey responses and data from institutional records.

Forty percent of the sampled nonreturning students (n=184) and 52 percent of the sampled persisters (n=304) completed the followup survey. Fifteen of the nonreturning students returned unusable questionnaires and these were removed from the analysis. In addition, the surveys of three nonreturning students were removed who were not on academic suspension and who did not plan to return to college; their numbers were not large enough to allow them to be analyzed as a distinct group. The remaining 470 students in the sample could be broken down as follows:

1) Academic Dismissals - Received less than 2.0 cumulative grade point average at the time of withdrawal	11% (n=50)
2) Stopouts - Students who left the University at least once and were currently enrolled or planned to reenroll at Boulder	9% (n=42)
3) Transfers - Currently enrolled or planned to attend another college	16% (n=74)
4) Persisters - Continuously enrolled since fall 1975	64% (n=304)
	100% (n=470)

In the actual 1975 freshman class, about 46 percent of the students could be classified as persisters as of the beginning of the fall 1978 term; also about 12 percent of the nonreturning students had reenrolled at the University sometime before the fall 1978 term. Of the nonreturning students in our sample, 53 percent left during the 1975-76 year and 44 percent during the 1976-77 year; the distribution of attrition from the actual 1975 freshman class for

those two years was 55 percent and 45 percent. A comparison of the persisters and nonpersisters in the sample with the total number of persisters and nonpersisters in the actual 1975 freshman class showed them to be representative of the total by sex, residency, ethnicity, and discipline as of the fall 1978 term.

Table 1 about here

Table 1 contains the background characteristics of the four groups in the sample. The proportion of men and women were about equal within each group except the academic dismissals, where men predominated. The proportion of nonresidents was similar in each group except for a higher percentage among the transfers. Nonwhites comprised a higher proportion of the stopouts and academic dismissals than the transfers or persisters. A high proportion of academic dismissals were enrolled in the natural or physical sciences while a large percentage of stopouts were originally "undetermined" majors. When examining academic ability and students' first term grade point average at the University, persisters and transfers were higher than academic dismissals and stopouts.

ANALYSIS AND RESULTS

Taken together, the Freshman Questionnaire, the followup survey, and data from institutional records contained 95 items that could serve as variable indicators in examining differences among persisters and nonpersisters. However, 68 of the items were conceptually designed to measure the following dimensions: goals for attending college, academic and social expectations, academic self-confidence, socioeconomic status, importance of grades, high school classroom experiences, concern for financing education, and use of campus services.

A principal components analysis with varimax rotation was performed on the 68 items to see if they would cluster according to their conceptually

appropriate dimensions. Then a principal components analysis was performed separately on the items for each dimension. Components or factors with eigenvalues greater than 1.0 were rotated to a varimax criterion. Factor-based scale scores were computed for each respondent on each of the resulting 14 factors using factor score coefficients for only those items with rotated loadings of .35 or greater. This method of computing scale scores used only characteristic items rather than all items irrespective of the size of their factor loadings (Kim and Mueller, 1978: 70-72). Table 2A shows the 14 factor variables and their rotated factor loadings. Forty-eight of the original 68 items are included in these 14 factors. However, based on the results of the factor analysis, the one goal, one academic self-confidence, and five expectation items listed in Table 2B were retained individually as variables. Therefore, of the 95 original items, the 68 involved in the principal components analysis yielded 21 independent variables -- 14 factors and 7 individual items.

Table 2 about here

The remaining 27 items were used as indicators of the 26 independent variables listed in Table 3. Many of these were found in previous research to explain differences between persisters and nonpersisters. One variable, academic ability, was measured by a two-item index consisting of a respondents' first semester grade point average and composite score on the American College Test (ACT). Please note that the variables with a + in Tables 2A, 2B, and 3 were based on items from the followup surveys; the others were from the Freshman Questionnaire or institutional records.

Table 3 about here

Stepwise discriminant analysis was used to eliminate the least important of the 47 variables before proceeding further. Variables were entered into the analysis on the basis of their ability to maximize the F ratio for the test

of differences among group centroids, which also minimizes Wilk's lambda, a measure of group discrimination. A second stepwise analysis was also run using a variable's contribution to Rao's V, a distance measure, as the entry criterion. On the basis of the above and the size of the standardized variable coefficients on the discriminant functions, the nine variables asterisked in Tables 2A, 2B, and 3 were eliminated.

Discriminant analysis was performed on the remaining 38 independent variables in the following four ways: 1) by examining the persisters and three types of nonpersisters, 2) by redoing #1 separately for men and women, 3) by examining persisters and all nonpersisters combined into one group, and 4) by redoing #2 separately for men and women. A final discriminant analysis examined the three nonpersister groups as to their reasons for dropping out of the University.

Because of space limitations, not all of the discriminant functions relevant to the discussion in the following sections will be presented in tables nor have tables of the variables means and standard deviations by group been included. However, these are available from the authors upon request.

Discriminant Analysis 1

A discriminant analysis of the 38 independent variables for the four groups produced three functions that accounted respectively for 61, 23, and 17 percent of the discriminating power and had canonical correlations with group membership of .62, .44, and .38. Wilk's lambda, a measure of group discrimination, was .42 ($p < .001$, chi square); when some discriminating power was removed by placing it in the first function, the lambda was .69 ($p < .001$), and when more was removed by placing it in the second function, the lambda was .85 ($p < .001$). The centroids for the four groups indicate that the first function distinguished among all groups (academic dismissals, -1.86; stopouts, -.89; transfers, -.35; persisters, .51), while the second function primarily dis-

tinguished between the stopouts/transfers, academic dismissals, and persisters, and the third primarily distinguished the stopouts from the other three groups. Clearly, all three discriminant functions are necessary for a complete description of group differences although the first is the most important; for the sake of brevity, only the first function will be discussed below.

Table 4 about here

Table 4 lists the standardized discriminant coefficients for the first function in stepwise order according to the ability of the variables to minimize Wilk's lambda. The most important discriminating variables were academic ability and frequency of using advising sources. An examination of the variable means by group showed that academic dismissals were the lowest group by far on the ability measure, while persisters were the highest. This finding confirms that of previous studies (cf., Maudal et al, 1977). The variable means also showed that persisters used advising sources more than the other three groups. Among the nonreturning students, stopouts used advising sources less than transfers and academic dismissals. This variable measured the frequency of seeking academic and vocational advising help in the previous term from faculty and academic departments. It may also have been an indirect indicator of integration within the University. For example, Spady (1971) has suggested that frequent interaction with faculty increases a students academic and social integration. When use of advising sources was examined by term of dropout for nonreturning students (in a separate analysis) second year nonreturning students were found to have used the faculty more than first year students, though both used academic departments as a source with the same frequency.

While academic ability and use of advising sources were clearly the most important discriminating variables, other variables with weights of over .20 and therefore of some importance included: the intellectual goal, concern for financing education, number of hours worked in the last term at the University, best academic advising source, and number of hours per week studied. An investigation of the variable means by group showed that students who withdrew because of poor grades tended to stress the importance of being able to apply their knowledge as a goal for attending college more than stopouts, transfers, and persisters, although this may also be a general characteristic of students in technical fields; the latter make up a high proportion of the academic dismissal group. The result concerning intellectual knowledge is similar to a finding by Morgan (1974) that male youths with low college grades had the highest ability to think abstractly and scientifically. Academic dismissals also had the greatest concern for financing education while transfers had the lowest. Transfers compared to other groups worked the least number of hours during their last term at the University. Transfers and persisters studied more hours per week in their last term than stopouts and academic dismissals. The latter studied the least.

Variables which had little relative importance as discriminating variables on any of the three discriminant functions included: the variety of classroom experiences in high school, percent of high school class attending college, birth order, expectations that values will change, expectations about participating in extracurricular activities, and person influencing career the most. Surprisingly, socioeconomic status was a relatively weak discriminating variable, although persisters and transfers came from slightly higher socioeconomic backgrounds than the other two groups. Finally, students' level of comitment to completing higher levels of education was not an especially important factor distinguishing persisters, transfers, voluntary withdrawals and academic

dismissals as was also found by Hackman and Dysinger (1970).

Discriminant Analysis 2

Following the lead of Baumgart and Johnstone (1977), the discriminant analysis was conducted separately for men and women. These results will be briefly summarized below and should be viewed with caution since subdividing the sample by sex reduced the size of some of the women's groups to a low level. The discriminant analysis for men produced three functions which accounted respectively for 57, 22, and 20 percent of the discriminating power and had canonical correlations with group membership of .70, .52, and .50. Wilk's lambda was .28 ($p < .001$). The discriminant analysis for women also yielded three functions which accounted respectively for 60, 25, and 15 percent of the discriminating power and had canonical correlations of .65, .49, and .39. Wilk's lambda was .37 ($p < .001$).

On the first discriminant function for men, which distinguished all four groups, the most important variables were academic ability (.90), frequency of using advising sources (.52), the intellectual goal (-.43), concern for financing education (-.39), and number of siblings (.31). On the first discriminant function for women, which also distinguished all four groups, the most important variables were frequency of using advising sources (-.74), academic ability (-.50), use of student services (.35), residency status (-.31), and plans to work in college (-.30). Academic ability distinguished groups of men more than women and the use of advising distinguished groups of women more than men. However, an examination of variable means by group for the men and women showed that both male and female persisters had higher academic abilities and used advising sources more when compared to the other three groups.

Discriminant Analysis 3

In order to examine the variables that just distinguish persisters from

nonpersisters, a discriminant analysis was performed on the persisters and the three groups of leavers combined. This analysis will also facilitate comparison of the present study with other attrition research that only looks at these two sets of students.

A discriminant analysis of the 38 independent variables produced one function which had a canonical correlation with group membership of .59 and a Wilk's lambda of .66 ($p < .001$). The centroid for persisters was -.53 and for nonpersisters was .97.

Table 5 about here

Table 5 lists the standardized discriminant coefficients for the discriminant function in stepwise order according to the ability of the variables to minimize Wilk's lambda. The most important discriminant variables were the frequency of using advising sources and academic ability. An investigation of variable means by group showed that the persisters were higher than the nonpersisters on both of these variables. When compared to nonpersisters, persisters also used student services slightly less, were more likely to be Colorado residents, worked more hours per week, were less likely to be politically independent, and were lower on the intellectual goal; all five of these variables had discriminant coefficients of between .20 and .30.

Discriminant Analysis 4

The discriminant analysis in the previous section was conducted separately for men and women and the results will be briefly summarized. The discriminant analysis for men produced one function with a canonical correlation with group membership of .66 and a Wilk's lambda of .57 ($p < .001$). The centroid for persisters was .69 and for nonpersisters was -1.1. The discriminant analysis for women produced one function with a canonical correlation with

group membership of .61 and a Wilk's lambda of .62 ($p < .001$). The centroid for persisters was -.53 and for nonpersisters was 1.1.

On the discriminant function for men, academic ability had the greatest weight (.85) followed by frequency of using advising (.72), number of siblings (.32), intellectual goal (-.31), self-confidence in math (-.29), and concern for financing education (-.29). An examination of the variable means by group showed that persisters were higher than nonperisters on all but the last two variables.

The variables which had the greatest importance in distinguishing the two groups of women were frequency of using advising sources (-.84), use of student services (.34), residency status (.33), political affiliation (-.32), number of hours per week worked (-.31), and socioeconomic status (-.29); academic ability only had a weight of (-.24). An examination of the variable means by group showed that persisters when compared to nonpersisters used campus advising sources more, used student services less, were more likely to be a Colorado resident, were less likely to be politically independent, worked more hours per week, were of higher background socioeconomic status, and had higher abilities.

Reasons for Dropping Out

On the followup survey administered to the nonpersisters, twenty-four of the items concerned reasons for dropping out. These are listed in Table 6. A discriminant analysis was performed on these variables for the three non-persister groups. It produced two functions that accounted respectively for 68 and 32 percent of the discriminating power and had canonical correlations with group membership of .66 and .52. Wilk's lambda was .41 ($p < .001$); when some discriminating power was removed by placing it in the first function, the lambda was .73 ($p < .002$). The centroids for the three groups indicate that

the first function distinguished among all groups (academic dismissals, 1.1; stopouts, .23; transfers, -.90) while the second function primarily distinguished between stopouts and the other two groups. Only the first function will be discussed below.

Table 6 lists the standardized discriminant coefficients for the first function in stepwise order according to the ability of the variables to minimize Wilk's lambda. The most important discriminating variables were poor study habits, hassles with registration, limited availability of desired courses, disliking the college environment, and needing a break from studies. An examination of the variable means for the three groups showed that academic dismissals placed more importance on poor study habits and problems with registration than the other two groups. Transfers placed more importance on the lack of availability of desired courses and on disliking the college environment than the other two groups. Stopouts placed more importance than the other groups on needing a break from studies. Lack of financial support, personal problems and poor academic/vocational advising were relatively unimportant in distinguishing between the three groups though they were moderately important in distinguishing stopouts from the others in the second discriminant function. However, some of these factors were of concern to all nonreturning students. For example, when all nonpersisters were asked to list the most important reasons for leaving, the one selected most frequently was lack of financial support, followed by interest in a program not offered at the University, needing a break from studies, poor study habits, disliking the college atmosphere, and personal problems.

DISCUSSION

Two variables emerged from this study as being the most powerful in

discriminating among persisters and types of nonpersisters. These were academic ability, as measured by standardized entrance examination scores and first term grades, and frequency of use of campus advising sources. Academic ability was the most important variable in distinguishing among male persisters and nonpersisters, while the frequency of using campus advising sources was the most important distinguishing variable for women. These findings combined with the fact that early dropouts used advising sources less than later dropouts suggest that advising can make a difference.

Variables which also distinguished among persisters and three types of nonpersisters included: intellectual goals, concern for financing education, number of hours worked, and number of hours per week spent studying. When viewed separately, the following patterns emerged for each group. Persisters had the highest academic ability, used advising sources most frequently, and studied the most hours per week. Transfers had the lowest concern for financing their education and worked the fewest hours during their last term. Stopouts made the least use of advising sources. Academic dismissals had the lowest academic ability, studied the fewest hours per week, showed the highest concern for financing their education, and placed the highest importance on intellectual goals for attending college.

One conclusion which can be drawn from these findings is that the importance of advising and the interpretation of test scores to students cannot be overestimated. This seems to be particularly true for women. Furthermore, it would appear that the earlier and more frequent the advising in the college experience, the more likely the possibility of persisting.

One surprising result of this study was its failure to support the findings of some previous studies that socioeconomic status was of particular value in distinguishing among persisters and types of nonpersisters. Other variables

with low discriminant function coefficients included the variety of high school experiences, expectations that values would change during college, and desire to complete higher levels of education.

These findings might suggest to the college advisor that preconceptions should be guarded against. The odds might not necessarily be on the side of the middle class student from a large suburban high school with many college-bound seniors. Nor are the odds necessarily against the Hispanic student from a small rural high school. One distinguishing factor may be the academic ability of the student in relation to the realism of the student's intellectual and academic goals. The fact that academic dismissals had the lowest ability scores and yet had high intellectual goals suggests that this lack of congruence may contribute to nonpersistence.

This study showed that both pre-college and post-matriculation variables were important in determining which students might be academic dismissals, stop-outs, transfers, or be continuously enrolled to graduation. Both sets of survey items constituted a longitudinal data base which was useful in determining important factors related to attrition. It is suggested that students be given a freshman survey at matriculation and a followup survey perhaps one year after matriculation to obtain enough longitudinal data in order to "flag" individual students who might have difficulty. This method may be helpful to institutions that want to identify groups of students who could be helped early in college before the attrition process is irreversible. As discussed below, discriminant analysis techniques and information from a longitudinal data base can be of immediate benefit in identifying students who may need help.

One of the features of discriminant analysis is its use in classifying the group membership of new cases based only on their values on the discriminating variables. Classification is achieved through the use of classification

functions. In the present study, each discriminant analysis yielded a set of classification functions. One way to distinguish among them and to also get some idea of the effectiveness of various discriminant analyses (besides examining Wilk's lambda or canonical correlations) is to see how well they reclassify the original cases. In our Analysis 1 (3 discriminant functions), a classification analysis was able to correctly place 78 percent of the original academic dismissals, 74 percent of the stopouts, 61 percent of the transfers and 65 percent of the persisters. Obviously, there is some margin of error, a fact also suggested by the canonical correlations. Subdividing the sample by sex as in Analysis 2 yielded percentages of correct placement of from 73 to 86 percent for men and 68 to 87 percent for women, clearly an improvement. (The percentages of correct placement in Analysis 3 for nonpersisters and persisters were 80 and 76 percent respectively; subdividing by sex in Analysis 4 produced percentages of correct placement for nonpersisters and persisters of 81 and 81 percent respectively for men and 80 and 82 percent for women). The classification functions for males and females produced in Analysis 2 can be of immediate benefit to the University of Colorado and to other similar institutions. Alternatively, a unique set of functions can be developed on these or other discriminating variables for any given college or University. In either case, discriminant analysis can have a direct programmatic use as well as serve as a general analytic tool in attrition research.

Table 1

BACKGROUND CHARACTERISTICS OF THE RESPONDENTS

	Academic Dismissals (n=50)	Stop-outs (n=42)	Trans-fers (n=74)	Persisters (n=304)
Sex				
Men	70%	55%	47%	49%
Women	30	45	53	51
	100%	100%	100	100%
Residency				
Resident	66%	57%	37%	59%
Nonresident	34	43	64	41
	100%	100%	100%	100%
Ethnicity				
White	90%	91%	96%	94%
Nonwhite	10	9	4	6
	100%	100%	100%	100%
Field of Study				
Natural/Physical Sciences	48%	21%	45%	38%
Business	6	10	10	13
Humanities	4	7	10	8
Social Sciences	6	14	14	15
Undetermined	36	48	23	27
	100%	100%	100%	100%
High School Percentile	65	76	81	82
* Father's Education				
High School or less	33%	26%	20%	16%
Some college	16	21	14	12
College graduate	29	27	34	40
Master's degree	8	5	4	13
Professional degree (Law, medicine)	8	10	27	12
Doctorate	6	10	1	7
	100%	100%	100%	100%
First term grade point average at the University (mean)	1.50	2.72	2.82	2.93

* Mother's education is not included due to a higher nonresponse rate.

Table 2A

VARIMAX ROTATED FACTOR LOADINGS

FOR GOALS, EXPECTATIONS, SELF-CONFIDENCE, SOCIOECONOMIC STATUS, IMPORTANCE OF GRADES, FINANCING EDUCATION, USE OF CAMPUS SERVICES, AND CLASSROOM EXPERIENCES IN HIGH SCHOOL

GOALS FOR ATTENDING COLLEGE	
Humanistic Goal	
To understand the humanities	.75
To develop cultural understanding	.71
To develop creativity for talent	.49
To develop sensitivity and tolerance for different cultures	.39
To understand the Social Sciences	.37
Intellectual Goal	
To develop skills for quantitative thinking	.58
To be able to question	.56
To acquire skills for self-learning	.52
To develop effective verbal communication	.48
To apply knowledge on new problems	.47
Individualistic Goal	
To develop identity, self-worth	.78
To develop individuality, self-reliance	.70
To develop a personal philosophy of life	.44
Social Goal	
To develop lasting friendships	.57
To develop social skills for interpersonal relationships	.56
To find a compatible spouse, prepare for a meaningful family life	.53
ACADEMIC AND SOCIAL EXPECTATIONS	
Expectations for Friends	
Expect to make many close friends in college	.76
Expect to date many persons of the opposite sex	.58
Expect to be homesick often	.42
ACADEMIC SELF-CONFIDENCE	
Self-Confidence in Math	
Ability to perform general algebraic computation	.88
Ability to do advanced mathematical problems	.89
Self-Confidence with Verbal Skills	
Ability to write concise expressive composition	.63
Ability to speak clearly,effectively	.51
Ability to write research papers	-.54
Ability for reading comprehension	.67
Extensive vocabulary	.71
SOCIOECONOMIC STATUS	
Socioeconomic Status	
Father's highest level of education	.81
Father's occupation (Duncan)	.68
Annual family income	.57
CONCERN FOR FINANCING EDUCATION	
† Concern for Financing Education	
Financial support from parents	-.60
Financial support from loan	.47
Financial support from grant	.57
Concern for financing education	.52
IMPORTANCE OF GRADES	
*Importance of Grades	
Importance of grades to oneself	.75
Importance of grades to parents	.59
USE OF CAMPUS SERVICES	
† Frequency of Using Campus Advising Services	
Use of academic advising - faculty	.51
Use of vocational advising - academic departments	.54
Use of vocational advising - faculty	.89
† Frequency of Using Student Services	
Use of academic advising - housing	.44
Use of academic advising - Educational Opportunity Program	.41
Use of academic advising - Student Services	.68
HIGH SCHOOL CLASSROOM EXPERIENCES	
Variety of Course Experiences	
Participated in large lecture classes	.60
Participated in videotaped lectures	.57
Participated in team teaching	.52
Participated in community experience	.45
Participated in off-campus courses	.60
Group and Research Experiences	
Participated in group project	.87
Participated in individual research	.40

* This variable was eventually eliminated from the analysis

† These variables were based on items from the follow-up survey

Table 2B

ADDITIONAL GOALS, ACADEMIC SELF-CONFIDENCE, AND EXPECTATIONS VARIABLES

Goals

To develop leadership

Academic Self-Confidence

*Am academically well prepared for college

Expectations

Expect to participate in extra-curricular activities
Expect that values/beliefs will change in college
Expect to find classes exciting
Expect to find programs to help
*Expect to have some emotional problems

Table 3

OTHER INDEPENDENT VARIABLES

Background

Ethnicity (White/Nonwhite)
Community type (Rural/Urban)
Political party (Independent/Other)
Birth Order (Oldest or only/Other)
Percent of high school class attending college (Majority/Less than majority)
Previous working experience (Less than one year/More than one year)
Number of siblings
Sex (Male/Female)
Residency (Resident/Nonresident)
*Participated in a busing program
*Number of books in parents' home
*Participated in political/social change movements
*Religious background (Protestant/Nonprotestant)
Academic ability index (ACT, First term grade point average)

Educational and Career Plans

Plans to work in college (Yes/No)
Planned occupation (Professional/Nonprofessional)
Certainty of career choice (Certain/Not certain)
Career influence (Parents/Other)
Highest degree planned (Phd., professional/Other)
Most important goal (Vocational/Other)
*Plan to join fraternity/sorority (Yes/No)

Educational and Work Experience at the University

Discipline (Technical/Nontechnical)
†Number of hours per week studied
†Best academic advising (Faculty/Other)
†Number of hours per week worked
*†Number of major changes

* These variables were eventually eliminated from the analysis.

† These variables were based on items from the follow-up survey.

Table 4

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

FOR DISCRIMINANT ANALYSIS 1: FOUR GROUPS

AND 38 VARIABLES IN STEPWISE ORDER

Step Number	Variables	First Discriminant Function	Wilk's Lambda
1	Academic Ability	.82	.78
2	Frequency of Using Academic/Vocational Advising Sources	.63	.68
3	Concern for Financing Education	-.28	.66
4	Residency	-.17	.64
5	Self-Confidence with Verbal Skills	-.08	.62
6	Plans to Work in College	.21	.60
7	Humanistic Goal	-.06	.59
8	Intellectual Goal	-.30	.58
9	Number of Hours per Week Worked	.23	.56
10	Sex	.17	.55
11	Political Party	.20	.54
12	Previous Working Experience	.18	.54
13	Number of Hours per Week Studied	.22	.53
14	Most Important Goal	-.13	.52
15	Group and Research Experiences - High School	.02	.51
16	Social Goal	-.05	.51
17	To Develop Leadership	.10	.50
18	Best Academic Advising Source	.22	.49
19	Expect to Find Classes Exciting	.17	.49
20	Use of Student Services	-.17	.48
21	Family Order	.03	.48
22	Expect to Find Programs to Help	.18	.47
23	Expectations for Friends	-.12	.47
24	Individualistic Goal	.05	.46
25	Self-Confidence in Math	-.12	.46
26	Discipline	-.04	.45
27	Highest Degree Planned	.03	.45
28	Community Type	.12	.45
29	Planned Occupation	.01	.44
30	Certainty of Career Choice	.01	.44
31	Ethnicity	.13	.44
32	Expect to Participate in Extra-Curricular Activities	.09	.43
33	Socioeconomic Status	.09	.43
34	Expect that Values will Change in College	-.09	.43
35	Percent of High School Class Attending College	.04	.43
36	Number of Siblings	.11	.42
37	Career Influence	.01	.42
38	Classroom Experiences - High School	.02	.42

Table 5

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

FOR DISCRIMINANT ANALYSIS 3: TWO GROUPS

AND 38 VARIABLES IN STEPWISE ORDER

Step Number	Variables	Discriminant Function	Wilk's Lambda
1	Frequency of Using Academic/Vocational Advising Sources	.80	.85
2	Academic Ability	.57	.79
3	Residency	-.26	.77
4	Humanistic Goal	-.14	.76
5	Socioeconomic Status	.14	.76
6	Number of Hours per Week Worked	.30	.75
7	Plans to Work in College	.19	.74
8	Political Party	.20	.73
9	Expect to Find Programs to Help	.18	.73
10	Intellectual Goal	-.24	.72
11	Expectations for Friends	-.17	.72
12	Use of Student Services	-.24	.71
13	Expect to Participate in Extracurricular Activities	.13	.71
14	Ethnicity	.16	.70
15	Concern for Financing Education	-.18	.70
16	Most Important Goal	-.13	.70
17	Number of Hours per Week Studied	.14	.69
18	Expect to Find Classes Exciting	.13	.69
19	Community Type	.17	.68
20	Best Academic Advising Source	.18	.68
21	Self-Confidence in Math	-.15	.68
22	To Develop Leadership	.17	.68
23	Previous Working Experience	.14	.67
24	Sex	.09	.67
25	Percent of High School Class Attending College	.10	.67
26	Number of Siblings	.10	.67
27	Planned Occupation	.11	.66
28	Certainty of Career Choice	-.10	.66
29	Expect that Values will Change in College	-.08	.66
30	Social Goal	-.09	.66
31	Discipline	-.05	.66
32	Group and Research Experiences-High School	-.05	.66
33	Classroom Experiences - High School	.04	.66
34	Individualistic Goal	.04	.66
35	Family Order	-.04	.66
36	Highest Degree Planned	-.02	.66
37	Career Influence	-.01	.66

Table 6

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

FOR DISCRIMINANT ANALYSIS OF THREE NONPERSISTER GROUPS

AND 24 VARIABLES IN STEPWISE ORDER

Step Number	Variables	First Discriminant Function	Wilk's Lambda
1	Poor study habits	.50	.71
2	Needed a break from studies	.30	.62
3	Became interested in a program not offered at CU	-.27	.58
4	Lack of financial support	-.07	.56
5	Health reasons	.12	.54
6	Enrolled in too many courses	.08	.52
7	Registration hassles and red tape	.39	.51
8	Marriage-had to work	-.26	.50
9	Disliked general college atmosphere	-.31	.49
10	Too many required courses	.20	.47
11	Poor academic/vocational advising	-.00	.46
12	Personal problems	-.10	.46
13	Moved from the area	.20	.45
14	Limited availability of desired courses	-.33	.44
15	Low academic standards	.29	.44
16	Conflict between job and studies	.22	.43
17	Difficulty of course material	.20	.43
18	Limited faculty assistance	.18	.43
19	Lack of evening courses in field of interest	.16	.42
20	Poor instructional equipment/ facilities	-.10	.42
21	Poor living situation	.08	.42
22	Lack of instructor's expertise or knowledge	-.18	.41
23	Lack of interest or relevance in courses	.11	.41
24	Limited cultural or religious environment	-.11	.41

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